

DETERMINANTS FOR THE UTILIZATION OF ANTENATAL CARE IN NEPAL

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ABSTRACT

INTRODUCTION

Antenatal Care (ANC) is an essential component of maternal health service and every woman should receive at least four ANC as prescribed. The aim of this study was to determine the individual, household and community factors responsible for the utilization of the ANC.

METHODS

An analytical cross-sectional study was conducted in the three randomly selected districts representing the three ecological zones of Nepal among 1302 women with a face to face interview.

RESULTS

The result of the study showed that 60.8% women received at least 4 ANC according to a national guideline. In multivariate analysis based on the binary logistic regression analysis six out of twelve individual (education (secondary and higher), occupation (business), media exposure, knowledge on BP&CR, knowledge on 4 ANC and knowledge on 4 ANC incentive), five-out of-eight household (family size (≤ 4), ethnicity (Brahmin/Chhetri), source of household income (job and remit), household income (middle, fourth and highest), sex of decision maker in household regarding health care (female)) and six out of ten community (involvement in community organization, involvement in income saving in community, access to FCHV, distance to nearest government health facility (≤ 2 km), availability of public transportation and time taken to reach nearest government health facility (≤ 30 minutes)) factors were revealed as important determinants for the utilization of ANC.

CONCLUSIONS

It is concluded that several individual, household and community factors have a significant role in the utilization of the ANC. It is recommended to raise the women's status in the family and community through higher education and empowerment. Awareness on ANC through mass media and community volunteers is also crucial. Greater attention should be provided by public authorities to make ANC accessible and available to all women, especially ethnic minorities, disadvantaged and women with low socioeconomic status.

KEYWORDS: Antenatal Care, Determinants, Nepal, Multivariate Analysis & Binary Logistic Regression Analysis

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INTRODUCTION

Globally, every day about 830 women die from preventable causes related to pregnancy and child birth (1). About 99% of these deaths occur in the developing countries with almost two-third in Sub-Saharan Africa and one-third in Southern Asia (2). It is estimated that the global maternal mortality ratio is 216 per 100 000 live births with 239 per 100 000 live births in the developing countries and only 12 per 100 000 live births in the developed countries (3).

Most of these maternal deaths are preventable with access to and the utilization of quality maternal health services during pregnancy, child birth and postpartum (1). The ICPD 1994 states that maternal health can be promoted by "education and services for antenatal care, safe delivery, and post-natal care, prevention of abortion, management of unsafe abortion and safe abortion services, referral for diagnosis and treatment for the complication of pregnancy, delivery and abortion" (4, 5).

Antenatal care indicates the care of women during pregnancy, which includes a number of services including educating women on healthy pregnancy behaviors, danger signs of complications, neonatal care, breastfeeding and family planning, screening, management and refer (if required) for pregnancy related problems and complications, providing essential care, supplements and prophylactics and encouraging the women to deliver in a health facility with a skilled birth attendant. At least four antenatal visits are recommended for all the pregnant women; first at 4, second at 6, third at 8 and fourth at 9 months of pregnancy (6-8).

The recent data showed that only six out of ten (60%) women received at least four ANC service in Nepal (9). Still now there is a low availability and access to quality maternal health services, especially in developing countries and in remote villages. The utilization of the available maternal health services is also very low due to several demographic, socioeconomic and other factors that present at the individual, household and community level (1, 10, 11). The objective of this study was to determine the role of the individual, household and community factors for the utilization of Antenatal Care (ANC) in Nepal.

METHOD

An analytical cross sectional study was conducted in the three randomly selected districts representing three ecological zones of Nepal. Jumla, Myagdi and Kanchanpur districts were randomly selected from the Mountain, Hill and Terai respectively. The sample size was obtained separately for each district initially and added to obtain the entire sample size. A total number of 1302 (430, 427 and 445 from Jumla, Myagdi and Kanchanpur) sample size was obtained with the known prevalence (51.1%, 47.8% and 56.8% in Jumla, Myagdi and Kanchanpur) at 95% confidence interval with the

known sample population (5320, 4490 and 22215 in Jumla, Myagdi and Kanchanpur) with design effect 1.2 using formula $n = [z^2 pqN / d^2 (N-1) + z^2 pq] / DEEF$.

Women of 15-49 years, who gave birth in two years preceding data collection and had a living child of 0-23 months were selected as the study population. Multi stage sampling was adopted in this study. In the first step, one district from each ecological zone was selected, based on the stratified random sampling. In the second step, each selected district was divided into several strata based on the local administrative units (village development committee and municipality) and 10 local administrative units were selected randomly, again based on stratified random sampling. In the third step, 3 clusters from each local administrative units were selected randomly. Hence there were 90 clusters (30 from each district) selected for the study. In the fourth step, the required number of the samples from each cluster was determined proportionately based on the total number of eligible samples in the cluster. In the fifth step, the respondents to be interviewed from each cluster were determined by systematic random sampling.

Data were collected by six well trained enumerators (two enumerators in each district) between February-September 2017 using pretested semi structured interview schedule with a face to face interview. Initially English version of the tool was prepared and then translated into Nepali. Again, it was translated to English to ensure that the meanings of the questions were not changed. The tool consisted four parts: individual factors, household factors, community factors and utilization of Antenatal Care. Utilization of Antenatal Care was the outcome variable. If a woman receives at least four Antenatal care first at 4, second at 6, third at 8 and fourth at 9 months of pregnancy, then it was operationally defined as the effective utilization of Antenatal Care. There were 12 individual, 8 household and 10 community level independent variables.

All the filled in questionnaires were crossed checked for completeness and consistency and verified at the evening on the same day of data collection. Data entry was carried out in Epi Data 3.1 software. All the data were inserted in the SPSS 22 version for analysis. Univariate analysis was carried out to describe the utilization of Antenatal Care. Pearson's chi-square test was applied for bivariate analysis. The binary logistic regression analysis was used for multivariate analysis. Both unadjusted and adjusted odd ration was obtained with 95% confidence interval for final interpretation.

Ethical approval was obtained from the Institutional Review Committee, Pokhara University Research Center, Nepal on 13th February 2017 (Ref. no. 107/073/074) and from the Institutional Ethical Committee for Biomedical Research on Human Participants, Sam Higginbottom University of Agriculture, Technology and Sciences on 21st March 2017 (Reg. no. IEC/SHUATS/2017/B/54). The objectives of the study, benefits and possible harms for the respondents were explained and informed consent were obtained before conducting the interview. The study was carried out with the full compliance of ethical guideline for conducting the research on human participant.

RESULTS

Only 1276 samples were included for the final analysis and interpretation, since 26 (2%) samples were with important data missing. Information regarding the utilization of Antenatal Care (ANC) is presented in the Table 1. The findings of the study revealed that nine out of ten women (92.0%) received ANC during last pregnancy. About seven out of ten women (68.9%) received at least four times ANC. But, only six out of ten women (60.8%) received at least four ANC according to the national guideline i. e. first at 4 month, second at 6 month, third at 8 month and fourth at 9 month.

Table 1: Information regarding the utilization of Antenatal Care (n=1276)

Variables	Frequency	Percentage
ANC during Last Pregnancy		
Yes	1174	92.0
No	102	8.0
Frequency of Antenatal Care		
≤4 visits	397	31.1
≥4 visits	879	68.9
Timing of Antenatal Care*		
4 month	951	74.5
6 month	964	75.5
8 month	996	71.1
9 month	1099	86.1
All 4 ANC according to Guideline	776	60.8

*Multiple responses.

The association between individual factors and the utilization of Antenatal Care are presented in the Table 2. Based on the bivariate analysis using Pearson's chi square (χ^2) test, ten out of 12 individual factors were significantly associated with the utilization of Antenatal Care ($P < 0.05$).

However, in the multiple logistic regression analysis, education of woman (secondary and higher), occupation of woman (business), frequency of media exposure, knowledge on at least three components of BP&CR, knowledge on 4 ANC according to national guideline and knowledge on 4 ANC incentive were revealed as determinants for the utilization of Antenatal Care.

The association between household factors and the utilization of Antenatal Care are presented 3. Bivariate analysis based on Pearson's chi square test revealed that four out of eight household factors were statistically significantly associated with the utilization of Antenatal Care ($P < 0.05$).

Table 2: The Association between Individual Factors and the Utilization of Antenatal Care

Independent Variables	4 ANC Visits According to National Guideline		Bivariate Analysis	Multivariate Logistic Regression Analysis			
	Yes (60.8%)	No (39.2%)	P value	UOR	95% CI	AOR	95% CI
Age of Woman							
15-19	83 (62.9)	49 (37.1)	<.001*	3.989	2.304-6.906	1.152	.499-2.656
20-34	662 (63.7)	378 (36.3)		4.124	2.659-6.396	1.196	.622-2.300
≥35	31 (29.8)	73 (70.2)		1.000		1.000	
No. Living of Children							
1	376 (70.4)	158 (29.6)	<.001*	8.065	4.618-14.085	2.623	.544-12.637
2-3	382 (57.6)	281 (42.4)		4.607	2.664-7.968	1.355	.621-2.956
≥4	18 (22.8)	61 (77.2)		1.000		1.000	
Birth Order of Last Child							
1	369 (70.7)	153 (29.3)	<.001*	3.290	2.449-4.420	.686	.163-2.883
2	278 (61.9)	171 (38.1)		2.218	1.649-2.983	1.178	.753-1.842
≥3	129 (42.3)	176 (57.7)		1.000		1.000	
Sex of Last Child							
Female	340 (63.0)	200 (37.0)	.178	1.000		1.000	
Male	436 (59.2)	300 (40.8)		.855	.680-1.074	1.058	.777-1.441
Age of Last Child							
0-11	431 (59.8)	290 (40.2)	.387	.905	.721-1.135	.965	.703-1.324
12-23	345 (62.2)	210 (37.8)		1.000		1.000	

Table 2: Contd.,							
Education							
No education	106 (31.1)	235 (68.9)	<.001*	1.000		1.000	
Primary	174 (56.1)	136 (43.9)		2.836	2.058-3.909	1.324	.869-2.020
Secondary	282 (74.4)	97 (25.6)		6.445	4.656-8.923	1.578	1.008-2.471
Higher	214 (87.0)	32 (13.0)		14.826	9.581-22.941	2.407	1.344-4.311
Occupation							
House worker	434 (60.6)	282 (39.4)	<.001*	1.000		1.000	
Agriculture	139 (51.7)	130 (48.3)		.695	.524-.921	1.106	.754-1.623
Business	74 (93.7)	5 (6.3)		9.617	3.840-24.082	3.348	1.119-10.020
Job	109 (80.1)	27 (19.9)		2.623	1.677-4.102	1.450	.831-2.529
Labour& others	20 (26.3)	56 (73.7)		.232	.136-.395	.595	.274-1.292
Frequency of Media Exposure							
Daily	131 (89.1)	16 (10.9)	<.001*	44.659	22.401-89.034	7.010	3.011-16.322
Usually	252 (80.3)	62 (19.7)		22.170	13.014-37.769	4.183	2.115-8.273
Occasionally	283 (66.6)	142 (33.4)		10.871	6.612-17.873	3.580	1.920-6.674
Rarely	88 (35.5)	160 (64.5)		3.000	1.777-5.065	2.135	1.123-4.061
Never	22 (15.5)	120 (84.5)		1.000		1.000	
Knowledge on at Least 3 Danger Signs of Pregnancy							
No	294 (44.5)	366 (55.5)	<.001*	1.000		1.000	
Yes	472 (77.9)	134 (22.1)		4.385	3.430-5.606	1.024	.725-1.446
Knowledge on at Least 3 Components of BP&CR							
No	190 (36.4)	332 (63.6)	<.001*	1.000		1.000	
Yes	586 (77.7)	168 (22.3)		6.095	4.759-7.806	1.543	1.093-2.179
Knowledge on 4 ANC a/c to National Guideline							
No	163 (31.2)	359 (68.8)	<.001*	1.000		1.000	
Yes	613 (81.3)	141 (18.7)		9.575	7.380-12.423	3.643	2.633-5.041
Knowledge on 4 ANC Incentive							
Yes	590 (84.2)	111 (15.8)	.001*	11.116	8.506-14.528	4.232	3.058-5.855
No	186 (32.3)	389 (67.7)		1.000		1.000	

*P is significant at the level of 0.05. Figures in parenthesis indicate the percentage.

In the multiple logistic regression analysis, family size (≤ 4), ethnicity (Brahmin/Chhetri), source of household income (Job and Remit), household income (middle, fourth and highest) and sex of household decision maker in family regarding health care, were obtained as the significant determinants for the Antenatal Care.

The association between community factors and the utilization of Antenatal Care are presented in the Table 4. Almost all the community factors were statistically associated with the utilization of Antenatal Care in bivariate analysis based on Pearson's chi square test ($P < 0.05$).

However, in the multiple logistic regression analysis, six out of ten community factors (involvement in the community organization, involvement in income, saving in the community, access to FCHV, distance to the nearest government health facility, mode of travel (public vehicle) and time taken to reach the nearest government health facility) were established as determinants for the utilization of Antenatal Care.

Table 3: The Association between Household Factors and the Utilization of Antenatal Care

Independent Variables	4 ANC Visit According to National Guideline		Bivariate Analysis	Multivariate Logistic Regression Analysis			
	Yes (60.8%)	No (39.2%)	P Value	UOR	95% CI	AOR	95% CI
Family Type							
Nuclear	276 (60.4)	181 (39.6)	.818	0.973	0.770-1.230	0.682	0.455-1.023
Joint/Extended	500 (61.1)	319 (38.9)		1.000		1.000	
Family Size							
≤4	240 (64.9)	130 (35.1)	.149	1.340	0.965-1.862	1.774	1.058-2.974
5-8	390 (59.6)	264 (40.4)		1.073	0.799-1.440	1.204	0.720-1.536
>8	146 (57.9)	106 (42.1)		1.000		1.000	
Ethnicity							
Dalit	133 (45.9)	157 (54.1)	<.001*	1.000		1.000	
Adibasi/Janjati	210 (55.0)	172 (45.0)		1.441	1.061-1.958	0.913	0.640-1.301
Brahmin/Chhetri	433 (71.7)	171 (28.3)		2.989	2.234-3.999	1.952	1.402-2.716
Religion							
Hinduism	662 (60.5)	432 (39.5)	.587	1.000		1.000	
Non-Hinduism	114 (62.6)	68 (37.4)		1.094	0.791-1.512	1.425	0.969-2.096
Household Head							
Male	657 (61.6)	410 (38.4)	.209	1.000		1.000	
Female	119 (56.9)	90 (43.1)		1.212	0.898-1.636	0.721	0.514-1.013
Income Source							
Agriculture	328 (53.7)	283 (46.3)	<.001*	1.000		1.000	
Own business	117 (66.5)	59 (33.5)		1.711	1.204-2.431	1.287	0.871-1.903
Job	140 (80.5)	34 (19.5)		3.573	2.365-5.338	2.130	1.349-3.362
Remit	135 (79.9)	34 (20.1)		3.426	2.277-5.153	1.626	1.018-2.599
Labour& other	56 (38.4)	90 (61.6)		537	0.371-0.777	0.753	0.501-1.131
Household Income							
Lowest	151 (41.8)	210 (58.2)	<.001*	1.000		1.000	
Second	116 (50.2)	115 (49.8)		1.403	1.006-1.955	1.114	0.780-1.592
Middle	142 (62.0)	87 (38.0)		2.270	1.617-3.186	1.540	1.059-2.239
Fourth	189 (75.9)	60 (24.1)		4.381	3.063-6.267	2.573	1.729-3.838
Highest	178 (86.4)	28 (13.6)		8.841	5.637-13.866	5.474	3.285-9.115
Decision Maker							
Male	256 (51.8)	238 (48.2)	<.001*	1.000		1.000	
Female	520 (66.5)	262 (33.5)		1.845	1.465-3.224	1.650	1.268-2.148

*P is significant at the level of 0.05. Figures in parenthesis indicate the percentage.

DISCUSSIONS

This study revealed that 92.0% women received at least one ANC during the last pregnancy. Finding of this study is the consistent with a study conducted in 2013 in the three districts (Bajhang, Dailakh and Kanchanpur) representing the three ecological zones (88.3%) and recent demographic health survey of Nepal (91.1%) (12, 13).

Consistent with the other studies, this study found that 68.9% women received at least four times ANC (13-15). Similarly, 60.8% women received at least four ANC with national guidelines in the present study. NDHS, 2016 reported 58.8% women received least four ANC with national guideline (13).

Table 4: The Association between Community Factors and the Utilization of Antenatal Care

Independent Variables	4 ANC Visit According to National Guideline		Bivariate Analysis	Multivariate Logistic Regression Analysis			
	Yes (60.8%)	No (39.2%)	P value	UOR	95% CI	AOR	95% CI
Place of Residence							
Rural	393 (56.2)	306 (43.8)	.001*	1.000		1.000	
Urban	383 (66.4)	194 (33.6)		1.537	1.223-1.932	.841	.495-1.428
Ecology of Residence							
Mountain	226 (53.2)	199 (46.8)	.001*	1.000		1.000	
Hill	270 (64.0)	152 (36.0)		1.564	1.188-2.060	1.348	.978-1.859
Terai	280 (65.3)	149 (34.7)		1.655	1.256-2.179	.885	.525-1.493
Involvement in Community Organization							
Yes	252 (78.0)	71 (22.0)	<.001*	2.906	2.169-3.894	2.084	1.502-2.891
No	524 (55.0)	429 (45.0)		1.000		1.000	
Involvement in Income Saving Groups							
Yes	409 (75.9)	130 (24.1)	<.001*	3.172	2.484-4.051	1.924	1.440-2.571
No	367 (49.8)	370 (50.2)		1.000		1.000	
Access to FCHV Service in Community							
Yes	669 (69.3)	296 (30.7)	<.001*	4.309	3.286-5.650	2.070	1.516-2.828
No	107 (34.4)	204 (65.6)		1.000		1.000	
Access to Ambulance in Community							
Yes	307 (68.8)	139 (31.2)	.001*	1.700	1.333-2.167	.888	.567-1.392
No	469 (56.5)	361 (43.5)		1.000		1.000	
Nearest Government Health Facility from Community							
UHP	318 (56.1)	249 (43.9)	.014*	1.000		1.000	
IHP	167 (60.7)	108 (39.3)		1.211	.903-1.624	1.001	.706-1.417
PHCC	135 (66.5)	68 (33.5)		1.555	1.112-2.174	.902	.581-1.400
Hospital	146 (67.6)	70 (32.4)		1.633	1.174-2.271	.911	.500-1.662
Others	10 (66.7)	5 (33.3)		1.566	.529-4.640	1.295	.389-4.310
Distance to Nearest Government Health Facility							
≤2KM	519 (75.9)	165 (24.1)	<.001*	4.100	3.229-5.207	2.004	1.303-3.083
>2KM	257 (43.4)	335 (56.6)		1.000		1.000	
Mode of Travel to Nearest Government Health Facility							
Walk	485 (54.7)	402 (45.3)	<.001*	1.000		1.000	
Public vehicle	125 (81.2)	29 (18.8)		3.573	2.336-5.465	2.688	1.621-4.459
Private vehicle	166 (70.6)	69 (29.4)		1.994	1.462-2.720	1.429	.895-2.281
Time Taken to Reach Nearest Government Health Facility							
≤30 minutes	546 (75.4)	178 (24.6)	<.001*	1.000		1.000	
>30 minutes	230 (41.7)	322 (58.3)		4.294	3.381-5.455	1.636	1.032-2.595

*P is significant at the level of 0.05. Figures in parenthesis indicate the percentage.

Women with secondary (AOR 1.578, 95% CI: 1.008-2.471) and higher education (AOR 2.407, 95% CI: 1.344-4.311) were more likely to utilize the ANC in this study. In a similar study conducted in Nepal in 2014 also reported the highest level of education significantly associated with both ≥ 4 ANC and quality ANC (16). Several studies have highlighted that education had the significant role for the utilization of Antenatal Care (14, 17, 18).

This study revealed that women with business, occupation were about three times (AOR 3.348, 95% CI: 1.119-10.020) more likely to utilize the ANC compared to the house worker. Similar findings were reported in studies from two developing countries, India and Cambodia (19, 20). It is well known that women who are involved in an occupation with regular cash income are more likely to utilize the health services.

The present study revealed that women's greater media exposure as an important determinant for the utilization of the ANC, which is similar to a study conducted in Kenya (21). In addition, studies from Nepal also reported the positive influence of mass media for the utilization of ANC (16, 22).

This study reported that women's knowledge on BP&CR significantly affect (AOR 1.543, 95% CI: 1.093-2.179) the utilization of the ANC. Evidences supported that BP&CR is an effective intervention for raising the utilization of maternal health care services in Nepal too (15, 23, 24).

This study also showed that knowledge on 4 ANC, according to national guideline was statistically associated (AOR 3.643, 95% CI: 2.633-5.041) with the utilization of the ANC. The studies from Myanmar and Ethiopia also suggested the knowledge and awareness of the maternal health services as an important predictor for the utilization of maternal health services (25, 26).

Our study showed a strong statistical association between knowledge on 4 ANC incentive (AOR 4.232, (95% CI: 3.058-5.855) and the utilization of Antenatal Care in the multivariate analysis. Studies from Nepal and abroad also concluded the positive impact of cash incentive for the utilization of maternal health services (27-30).

The result of the current study revealed that women from family size ≤ 4 was about two times (AOR 1.774, 95% CI: 1.058-2.974) more likely to utilize the ANC than women with family size ≥ 8 . Consistent with a study from India also concluded that the utilization of maternal health services were higher in smaller families compared with large family size (31).

Likewise, present study concluded that women from Brahmin/Chhetri were about two times (AOR 1.952, 95% CI: 1.402-2.716) more likely to utilize ANC than women disadvantaged Dalit ethnic group. The results of the recent studies from Nepal also concluded that women from ethnic minorities and disadvantaged groups were less likely to utilize maternal health services (15, 32). It may be that women with a higher ethnic group are more educated and have more access to health services.

This study showed the statistical association between household income (middle, fourth and highest) and the utilization of Antenatal Care. The higher the household income, higher the utilization of Antenatal Care service, reported by other studies too (33-35).

The present study concluded that sex of decision maker regarding health care (female) in the household also influence in receiving Antenatal Care. Evidences suggested that the utilization of Antenatal Care is more common among the women who have autonomy in decision making (16, 36, 37). However, no studies have been found that evaluated the differences in the utilization of Antenatal Care between male and female decision maker regarding health care in a household. This indicates females can understand health condition and health need of the females better than the male.

The present study showed that women involved in various community organizations (AOR 2.084, 95% CI: 1.502-2.891) and income saving in the community level (AOR 1.924, 95% CI: 1.440-2.571) were more likely to utilize Antenatal Care. In support to this result, a study conducted in India, reported that social networks of women operating at the community level were positively associated with all the antenatal, delivery and postnatal care utilization (38).

Likewise, the present study reported that women who were living in the communities with an access to the female community health volunteer were two times (AOR: 2.070, 95% CI: 1.516-2.828) more likely to utilize ANC than those

women living in the communities with no access to the female community volunteer. The role of women's health volunteer groups for the diffusion of maternal health knowledge and thereby utilization of maternal health services has established by many studies in Nepal and as well as in abroad (30, 39-41).

Distance to the nearest health facility is positively associated with ANC in this study as like other studies (42, 43). This study found that women who were living in the communities with the distance to the nearest government health facility ≤ 2 kilometer were two times (AOR 2.004, 95% CI: 1.303-3.083) more likely to receive ANC compared to women living in the communities with distance to the nearest government health facility > 2 kilometer. In fact, physical access to the health service is also an important determinant for the utilization of maternal health services including Antenatal Care.

Access to transportation also reported as a significant factor for receiving ANC in the present study. Some systematic reviews and qualitative studies from Nepal reported that there is a low utilization of available maternal health services in rural, mountains and hilly areas due to lack of transportation or poor transportation (44-46).

Similarly, women who had to travel ≤ 30 minutes to reach the nearest government health facility were about one and a half times (AOR 1.636, 95% CI: 1.032-2.595) more likely to utilize ANC than those who had to travel > 30 minutes. Lesser the time to reach the health facility, higher the utilization of maternal health services, especially delivery care and care for other emergency obstetric complications has been reported by many studies (46, 47).

CONCLUSIONS

The study concluded that several individual, household and community factors have a significant role in utilization of antenatal care. It is recommended to provide higher education for girls and aware women on antenatal care using various mass media to address individual factors. Similarly, it is essential to raise the status of women in the family and community with special emphasis on women from ethnic minorities and disadvantaged groups. Attentions should also be provided by public authorities to make maternal health service accesses to all women.

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